



ISSGPU NEWSLETTER

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A Publication of the
Indian Society for Sheep & Goat Production and Utilization

September, 2014

From the President's desk

Small ruminants play an important role in the food and nutritional security of millions of rural people especially the landless, marginal and small farmers besides forming an important niche in small farm system. The socio-economic value of small ruminant rearing as compared to other livestock species, for poor and marginalized farmers is immense. Sheep and goats produce a variety of products (meat, milk, skin, wool and manure) and thrive well in the semi-arid and arid regions, where they can sustain on sparse vegetation and extreme climatic conditions. The rural poor who cannot afford to maintain a cow or a buffalo find sheep and/or goat keeping as the best alternative source of supplementary income. It has been realized that the potential opportunities to expand and benefit from integrating small ruminants in to annual and perennial cropping systems remain largely unexplored. Sheep rearing practice is gradually getting transformed from transhumance and extensive production system to semi-intensive and intensive (stall feeding) type that involves greater input to meet the deficit and to harness profit. The semi-intensive type can be sub-grouped as mixed extensive system and mixed crop-livestock production system that depend largely on integrated farming system involving crop and livestock production. The focus should be to adopt semi-intensive/commercial production systems, upgradation of native germplasm of high growth potential, application of assisted reproductive technologies, provision of improved quality feed and fodder and health care.



Although co-habitation of sheep and goat has been practiced since ages, an undercurrent preference for goat production cannot be ignored. This principally emanates from declining commerce from sheep wool and wool production system and advantage of harnessing milk and milk products from goats. There is scope for a healthy competition between the two species for their co-existence and it demands profitable sheep production and expanding the scope from a dual-purpose to triple-purpose animal that can provide wool, meat as well as milk. Extending from co-habitation to co-production of sheep and goat with diversified output in terms of fiber (fine wool, pashmina, carpet wool, hair and fiber), meat and milk besides hides, skin and manure will certainly promise better economic return, profitability and sustainability for the small ruminant keepers in India and other developing countries.

Our role must therefore is to expand the scope of sheep and goat production system and enrich the community with desired information, knowledge and technologies for productivity augmentation. ISSGPU aims at transmitting the collective information through this 'Newsletter' and I wish it to serve as a valuable link between farmers, researchers and entrepreneurs to transpire sustainable small ruminant production in the country.

Jai Hind!

S.M.K. Naqvi

ISSGPU congratulates Dr Raghvendra Bhatta (Memb. No. 0244012002) for joining as Director, NIANP, Bengaluru and Dr B.N. Tripathi (Memb No. 634012009) for joining as Director, NRC on Equines, Hisar

Announcements:

1. *National Seminar on "Prospects and Challenges in Small Ruminant Production" will be organized by Sheep Breeding Research Station, TANUVAS at Hotel PREETHI Classic Towers, Ooty, 11-12th Dec. 2014. For detail kindly contact Dr M lyue, Professor & Head, Sheep Breeding Research Station, Sandynallah, Ooty, sbrs@tanuvras.org.in Mob. +91-99430 36735.*
2. *One day Interactive meet on "Strategies for improvement in meat production from existing small ruminant rearing system" will be organised at CSWRI Avikanagar on 10th January 2015. For detail kindly contact Dr S K Sankhyan, Principal Scientist, Animal Nutrition. Besides thematic presentation by experts, a session on poster presentation will also be organised for selected research papers.*



Editorial

Increasing per animal productivity: The primary objective of successful and profitable small ruminant production aims at enhancing life-time productivity or whole-farm output, which can be achieved by ensuring nutritional adequacy and nutritional sustenance during scarcity, exploring 'in-ovo/in-utero' nutritional supplementation strategies for minimizing empty days and harnessing maximum production during potential productive life, manipulating neonatal weight gain, post-parturition nutrition, nutritional support to prolific sheep and by integrating feeding, breeding, management and health cover vide multidisciplinary approach.

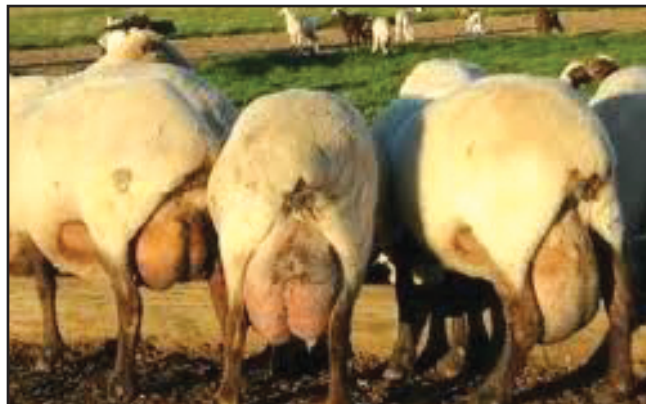
CO-GRAZING SHEEP AND GOATS: IS IT BENEFICIAL?

Co-grazing of sheep and goats has been practiced since time-immemorial and is quite common around the world. Advantages of co-grazing of sheep and goats are derived primarily from differences in preferences for particular plant species and parts, abilities or willingness to consume forages that are not highly preferred. Sheep and goats vary in many characteristics that influence how they graze. Ruminant species are commonly classified into morphological feeding types of grass/roughage consumers or grazers, concentrate selectors, and ones with intermediate behaviors or mixed feeders. Sheep are categorized as grazers, while goats are usually placed in the intermediate group and are quite agile, frequently uses a bipedal stance and climb to gain access to vegetation of interest. Browsing habits of goats makes them access to tanniferous plants while close-grazing in sheep helps them to penetrate down into the canopy with deep bites and are thus comparatively more selective with the mature grasses. Advantages of these differences can be taken through co-grazing for increased production per unit land area under many vegetation conditions, most notably presence of a diverse array of plant species. The advantage can only be realized if total stocking rate or carrying capacity is optimized and by increasing vegetation diversity to minimize dietary overlap. Botanical composition and available forage mass are also important determinants besides the factors affecting nutrient requirements such as body weight and production state, preference for the forages present and the length of grazing that contributes to voluntary feed intake. Nonetheless, successful co-grazing will require input from producers, both at the onset and continually throughout grazing seasons.

A. Sahoo, S.K. Sankhyani, CSWRI, Avikanagar

DAIRY SHEEP: EXTENDING SCOPE AND PROFIT

The demand of sheep milk for manufacture of different milk and milk products is increasing worldwide, but it is well organized in France, Germany, Israel, Italy, Spain and Turkey than in others countries. Sheep milk



commercially or traditionally is used for preparing ice cream, milk powder, traditional milk products, chhana, paneer, and ghee even soaps, lotions, and sweets, besides the popular cheeses and yoghurt. Sheep milk, due to their nutritional and antiallergenic properties, is beneficial for children, young and sick people. Low daily volume may be one of the reasons for the difficulty in establishing an efficient processing industry of sheep milk in the country.

Sheep milk has 80.71% water, 7.90% fat, 5.23% protein, 4.81% lactose, 0.90% ash, 11.39% SNF and 19.29% total solid while goat milk is lower in total solid, SNF and fat. Although milk yield of goat in comparison to sheep is higher but on 4% fat



corrected milk (FCM), the milk yield of both species is become similar. East Friesian sheep of Germany yield 632 kg of milk with 6.48% fat in a lactation period of 300 days, and the yield becomes 868kg on 4% FCM. Milk yield of Awassi varies from 65.9 kg in 172 days lactation in Iraq to 506 kg in 214 days in Israel. Indian sheep produces only 0.25–0.5 kg milk/d. A promising breed Patanwadi from Gujarat produces 0.70-1.2 kg milk/day.

Milk yield of different sheep breeds (after suckling)

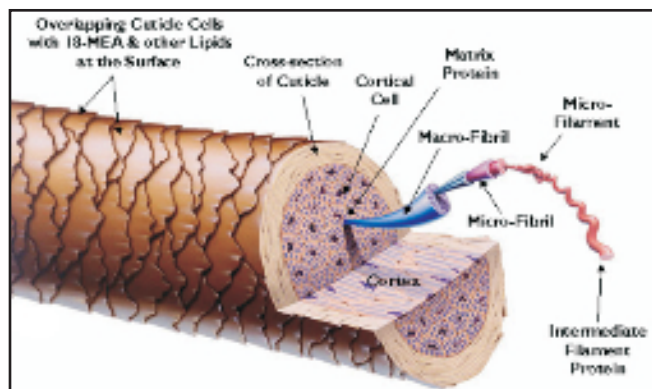
Breeds	Country	Lactation length (days)	Milk yield (kg)	Fat %	FCM (kg)
Israeli Awassi	Israel	270	495	6.66	693
Assaf	Israel	180	180	7.22	267
East Friesian	Germany	300	632	6.48	868
Lacaune	France	165	270	7.40	408
Corsica	France	170	108	8.33	178
Chios	Greece	210	218	7.79	342
Karagouniki	Greece	168	142	8.45	237
Kymi	Greece	192	135	8.14	219
Comisana	Italy	150	132	8.33	218
Sarda	Italy	200	158	6.96	228
Canar ia	Spain	200	180	7.77	282
Manchega	Spain	210	300	9.33	540
Awassi	Turkey	120	168	6.54	232



Most of the dairy sheep are found in Middle East and reared in dry environment. If these breeds are procured and introduced in dry parts of our country it will improve livelihood and nutritional security of poor farmers.

A.K. Shinde, CSWRI, Avikanagar

KERATIN – A BIO-MATERIAL FOR BIO-MEDICAL APPLICATION



The term “keratin” originally referred to the broad category of insoluble proteins that associate as intermediate filaments (IFs) and form the bulk of cytoplasmic epithelia and epidermal appendageal structures like hair, wool, horns, hooves and nails. It is abundantly available, renewable and inexpensive by-product of poultry industry, slaughterhouse, leather tanning and fibre industry, considerable amount of which is often wasted. Keratin are difficult to degrade and may lead to environmental hazard. Global research is going on to utilize these waste by converting it into biomaterials with excellent properties.

Keratin is broadly classified as hard keratin (5% sulphur) and soft keratin (1% sulphur). It is mechanically robust and chemically unreactive due to tight packing of protein chain in the form of alpha helix or beta sheet into a super coiled polypeptide chain cross linked with disulphide bonds. Keratin as a protein-based biomaterials has many biomedical applications due their ability to function as a synthetic extracellular matrix that facilitates cell-cell and cell-matrix interactions. Such substrates contain a defined, three-dimensional microstructure that supports cellular proliferation and cell-guided tissue formation, both of which are important characteristics for biomaterial scaffolds. In addition, the strong bioactivities and diverse physiochemical properties of proteinaceous macromolecules are attractive for other biomedical applications for which biocompatibility is essential, such as medical devices, bioactive surfaces, hygiene products, etc. Keratin biomaterials possess many distinct advantages over conventional biomolecules, including a unique chemistry because of its high sulphur content, remarkable biocompatibility, self-assembly propensity and intrinsic cellular recognition. Research efforts are needed to understand and exploit these

biomaterials for various biomedical applications.

Vinod Kadam, D B Shakyawar, Ajay Kumar, P K Pareek, CSWRI, Avikanagar

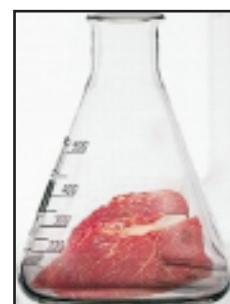
RELEASE OF HIGH DENSITY SNP GENOTYPING CHIP FOR SHEEP

An international team comprising of Farm IQ, a joint venture of New Zealand Government and Industry Primary Growth Partnership Program, Illumina and the International Sheep Genomics Consortium (ISGC) have developed a high density SNP Genotyping chip “Ovine Infinium® HD SNP BeadChip” for analyzing the sheep genome. It is a new advancement in the field of sheep genomics as it can bring about a paradigm shift in conducting genome wide association studies (GWAS) as well as copy number variants (CNV) studies in sheep. This new chip is capable of identifying up to 600,000 SNPs across the sheep genome, which will be helpful to identify the key genes more rapidly than any other methods. Thus, this high density chip will provide the researchers considerably higher precision as well as resolution than any other traditional techniques. As this new HD chip includes 53000 of the DNA variants that are known to affect the proteins, therefore it is the best way to measure the quantitative traits. This chip has been used to test 5000 animals from a wide range of breeds and has proved to be very accurate and robust. One of the most important feature of this HD chip is that it has been customized and it has leverage to update it, if new/rare SNPs are being found anywhere else. Although before the development of this HD chip for sheep, some other chips like SNP50 bead chip and low density 7000 array are available; for speed and cost effectiveness researchers may use this new high density chip for key animals. It will provide a more comprehensive view of genome variation and complement current genome wide association studies in identifying various genotypic traits more precisely.

Bipul K Jha, Vijay Kumar Saxena, Kalyan De, Davendra Kumar, S.M.K Naqvi, CSWRI, Avikanagar

ARTIFICIAL MEAT

In recent years the notion has been growing that alternatives may be needed for conventional meat production through livestock. This is generally based on concerns about sustainability, environmental burden and animal welfare due to intensification of livestock herding and slaughtering, and a predicted rapid increase in global meat consumption. As one of the alternatives for livestock meat production, in vitro culturing of meat is currently studied. The generation of bio-artificial muscles from satellite cells has been ongoing for about 15 years and





technologies to create skeletal muscle and fat tissue have been developed and tested, but has never been used for generation of meat, while it already is a great source of animal protein. In order to serve as a credible alternative to livestock meat, lab or factory grown meat should be efficiently produced and should mimic meat in all of its physical sensations, such as visual appearance, smell, texture and of course, taste. The efficient culture of meat will primarily depend on culture conditions such as the source of medium and its composition. Protein synthesis by cultured skeletal muscle cells should further be maximized by finding the optimal combination of biochemical and physical conditions for the cells. Many of these variables are known, but their interactions are numerous and need to be mapped. Given the urgency of the problems that the meat industry is facing, this endeavour is worth undertaking. As an additional benefit, culturing meat may provide opportunities for production of novel and healthier products.

Source : Meat Science 92 (2012), 297–301.

NOVEL SNPS REVEAL SIGNIFICANT ASSOCIATION WITH GROWTH TRAITS IN INDIAN GOAT BREEDS

Investigation on effect of genetic polymorphisms in IGF-1, GHR and IGFBP-3 genes on body weight of Sirohi and Jamunapari breeds revealed that two SNPs of IGF-1, one SNP of GHR and one SNP of IGFBP-3 genes have significant association with body weight in Sirohi goat at different ages and only 1 SNP of GHR gene was found to be associated with body weight at birth in Jamunapari goat. The findings of the present study can be used for selection of animals with superior growth performance. The differences in SNP allele frequency of the underlying populations are useful in the candidate gene association studies. It is also understood that complex production-related traits are independently influenced by variations in multiple genes. The haplotypes in IGF-1 gene were significantly associated with body girth at 9 months of age in Sirohi goats and with body height at birth in Jamunapari goats. Also, there are some reports on association of haplotypes of GHR gene with milk production traits.

Source: A. Sharma, G. Dutt, J. Aivalingam, M.K. Singam, S.V. Singh, O.P. Pathodiya, B.S. Khadda, S.P. Dixit (Small Rum. Res. (2013), 115, 7–14.

ADJUSTABLE SLATTED FLOOR FOR GOATS

The goat production system is gradually shifting from extensive to semi-intensive/ intensive type in developing a commercial goat entrepreneurship. The necessity of different type of housing structures for goats vary with production systems, flock sizes, stakeholders/ farmers socio-economic conditions, agro-climatic zone etc. Among the available floor types, the soil/ kutchha floor is more comfortable for goats, easy to clean and disinfect, economical and is normally recommended for farmers. The slatted/ raised floors in goat sheds made of bamboo/



wood/ perforated plastic are also recommended for high humid areas. However, its need under arid/ semi-arid areas for goats are not known. Moreover, prevailing climate changes are impacting goat production system due to severe cold and harsh hot conditions, which generated necessity to search alternate and efficient housing systems for goat in minimizing production losses. The height of the slatted floor is normally recommended at 5 feet to have easy cleaning but varies widely depending on the agro climatic conditions and production system. The fixed height floors cannot be used for multiple purposes, whereas adjustable slatted floor can be used in protecting the animals from winter and hot weather conditions. Moreover, the most suitable height of slatted floor for goats are also not known. Therefore a small adjustable slatted floor (15'×20' size) is constructed using Mirandi wood slats having 2" width and 1" thick with 1.5 cm gap between slats. The height of the floor is designed to have adjustment at 1.25, 2.5, 3.75, 5.0 feet from the ground level using nut and bolts system in the wooden pillars. The designed slatted floor will be widely utilized to record the growth of kids, milk yield of lactating does at different heights having due consideration on microclimate, welfare of goats, worm load (EPG), labor saving etc so as to assess the necessity of slatted floor before recommending for farmers in dry regions.



N Ramachandran, M K Tripathi, B Raj, S K Jindal, A K Dixit, Souvik Paul CIRG, Makhdoom

NEWS AND INFORMATION

- ❑ **One day sensitization workshop** of different State Govt. officials on "Sheep & Wool Development, Marketing, Value Addition and Product Development" held on 14/02/2014 at Central Sheep and Wool Research Institute, Avikanagar. The



meeting was jointly chaired by Dr. S.M.K. Naqvi Director, CSWRI and Er K.K. Goyal, Executive Director CWDB. The workshop was attended by the Heads/ Senior officers of the Animal Husbandry /Sheep & Wool Development Federation /Corporation from the different wool growing states.

- ❑ **Interactive Meeting** on “Prospects in Improving Production, Marketing and Value Addition of Carpet Wool” was held on 31st December 2013 at Arid Region Campus (CSWRI), Bikaner. Hon’ble DDG (AS) ICAR, Prof. K.M.L. Pathak was the Chief Guest on this occasion. Prof. A.K. Gahlot, Hon’ble Vice Chancellor, RAJUVAS; Dr A. K. Dahama, Hon’ble Vice Chancellor, SKRAU; Dr S.M.K. Naqvi, Director, CSWRI Avikanagar, Dr S.K. Aggarwal, Director, CIRG, Makhdoom; Dr S. K. Chattopadhyay, Director, CIRCOT Mumbai; Dr M.M. Roy, Director, CAZRI Jodhpur; Dr R.M. Acharya, Former DDG (AS); Er K.K. KGoyal, Executive Director, CWDB Jodhpur; Dr S.A. Wani, Dean SKUAST, Srinagar and about 125 participants (Farmers, entrepreneurs, technocrats, scientists and students participated in the meeting.
- ❑ **International Invitee**, Prof. S.N. Parida, Head, Vaccine Differentiation Group at Pirbright Institute, UK and Adjunct Professor to Murdoch University, Australia, Jenner Investigator, Oxford University, UK delivered a theme lecture in the interactive meeting at ARC (CSWRI), Bikaner.
- ❑ **National Seminar & Annual Conference** on “Sheep and Goat Biodiversity and Breeding Policies-Issues and Perspective” was organized by Krantisinh Nana Patil College of Veterinary Science, MA& FSU, Shirwal (Satara), Maharashtra in collaboration with ISSGPU during February 21-22, 2014 at Mahabaleshwar. Honorable Sh Vadkute R.S. Chairman, Puna Shlok Ahalya Devi Sheep & Goat Development Corporation Maharashtra presided as the Chief Guest along with Guest of Honour, Prof. A.K. Mishra, Vice Chancellor, MAFSU and President ISSGPU, Dr. S.M.K. Naqvi, Director, CSWRI, Avikanagar. Dr A.T. Kumar, Commissioner, Animal Husbandry (MS) chaired the session on Scientist-farmer Interface. Dr N.V. Patil, Director, NRC Camel, Bikaner, Dr Chanda Nimbkar, Director, NARI, Phaltan, Dr S.A. Wani, Dean, SKUAST Srinagar, Dr S.T. Bapat, Associate Dean, KNP College of Vet. Sc.; Dr A.K. Mishra, Principal Scientist, NBAGR & Vice President, ISSGPU attended the meeting. About 150 participants from ICAR research institutes, SAUs, representatives from Industries, farmers and students attended the meeting.
- ❑ **New Laboratory Block of CIRG inaugurated:** Dr. S. Ayyappan, Secretary, DARE and DG, ICAR inaugurated new laboratory block of Central Institute

for Research on Goat (CIRG), Makhdoom on 6th April 2014. Prof. K.M.L. Pathak, DDG (Animal Sciences); Dr B.S. Prakash, ADG (AN&P); Dr S.K. Agarwal, Director, CIRG, Dr A.C. Varshney, VC, DUVASU, Mathura; Dr Dheeraj Kumar, DRMR, Bharatpur; Dr S.K. Dubey, In-charge, CSWCRTI, Chhalesar, Agra; Dr S.K. Garg, Dean, Veterinary College, Mathura were the other dignitaries.

- ❑ CIRG organized Farmers' awareness programme at Kendupali Village, Bargar district, Odisha on 28.2.2014 under NICRA project on “Assessing resilience of small ruminant production under changing climatic conditions in semi-arid zone”, on National Science Day. This event was organized with the help of local veterinary officers of Odisha and one NGO-Gopal Biotech Agro Farm, Kendupali, Bargarh and about 150 traditional goat farmers from Sambalpur, Bolangir, Kalahandi, Bargarh and Jharsuguda districts participated in the event.
- ❑ XII Annual Review Meeting of All India network Programme on Gastrointestinal Parasitism was held on 2nd August, 2014 at Central Sheep and Wool Research Institute, Avikanagar. Prof. K.M.L. Pathak, DDG (Animal Science), inaugurated the event and released Hindi Patrika Avipunj, Pamphlet on “Sheep Grazing and Pasture Management in Dry Areas” and Research Paper Data Base- 2004-2014. Dr B.P. Mishra, Project Coordinator, IVRI, Izatnagar presented the overview of the project. Dr Gaya Prasad, ADG (Animal Health) reviewed the progress of all the centres. Pls/Co-Pls from IVRI, Izatnagar, IVRI, Mukteswar, GBPUAT, Pantnagar, MPPCVV, Jabalpur, MVC, Chennai, WBUA&FS, Kolkata, CSWRI, Avikanagar, ICAR Research Complex for NEH Region, Barapani and Sikkim participated in the meeting.
- ❑ Three months hands on Training on “Woollen product manufacturing and designing for rural women” and a five days training on “Pashmina fibre identification through PCR based technique” for faculty members of Sher-e-Kashmir University of agricultural Science and Technology, Kashmir (SKUAST) inaugurated by Prof. M.P. Yadav, Secretary, National Academy of Agriculture Science (NAAS) at CSWRI, Avikanagar on 24.03.14. Two folders namely, “Innovative anti-moth finishing for pashmina shawls” and “Development of standard quality norms for pashmina shawls” were released for technology dissemination.
- ❑ The scientist delegation from Bangladesh, Dr. Md. Nazrul Islam, Director General, Bangladesh Livestock Research Institute, Mrs. Delwora Begum, Deputy Secretary, Ministry of Fishery & Livestock, Dr. Md. Ershaduzzaman, Project Director (Sheep Project), Pulakash Mondal, Senior Assistant Chief, Ministry of Fisheries and Livestock and Md. Tanjim,



Assitant Chief Planinig Commission visited CSWRI on 06.04.14 and showed keen interest in technologies viz. AI in sheep, FecB gene concept, milk replacer feeding, mutton production, coarse wool utilization, management of GI parasitism and development of resistant flock, etc.

- ❑ CSWRI Awarded best stall in Western regional Krishi Vigyan Mela and Sangosthi (04-07 Feb., 2014) at NRCSS, Ajmer.
- ❑ **Dr A. K. Goel**, Principal Scientist (Animal Repd., CIRG, Makhdoom) received 'Fellowship Award of ISSAR-2013' from the Indian Society for Study of Animal Reproduction in recognition of his meritorious contribution to the Research, Training and Extension in the field of 'Animal Reproduction' at MAFSU, Nagpur on January 8, 2014.
- ❑ **Dr Ashok Kumar**, Principal Scientist (Veterinary Medicine, CIRG, Makhdoom) received "Ram Lal Agrawal Gold Medal Award-2014" from Indian Society for Veterinary Medicine at Jammu for outstanding contribution in Veterinary medicine-herbal drug research on 15th Feb. 2014.

- ❑ **Dr M.K. Tripathi**, Principal Scientist (Animal Nutrition, CIRG, Makhdoom) has received "Best Reviewer Award 2013" by Asian-Australasian Journal of Animal Science for his meticulous reviewing of the manuscripts that were submitted to the journal for publication during 2013.
- ❑ **Dr. Satish Kumar**, Senior Scientist (Animal Biotechnology) undergone training (13th Sept 2013 to 11th Dec. 2013) on "Molecular Marker (Animal Sciences)" at the Division of Genetics and Genomics, Roslin Institute & Royal (Dick) School of Veterinary Studies, The University of Edinburgh, Scotland, UK and **Dr. Rajiv Kumar**, Scientist (Animal Biotechnology) undergone training (25th Sept 2013 to 25th Dec. 2013) on "Transgenic Animals (Animal Science)" at the Department of Physiology and Pharmacology, Texas A & M University, USA, instituted by NAIP-PIU-ICAR, Govt. of India.



DG, ICAR & SECRETARY, DARE, DR S. AYYAPPAN INAUGURATED NEW LAB BUILDING AT CIRG MAKHDoom



CHAIRMAN, ASRB VISITING CSWRI EXHIBITION AT NRCSS, AJMER



MOU SIGNED BETWEEN CSWRI, AVIKANAGAR AND RAJUVAS, BIKANER



PROF M.P. YADAV, FORMER DIRECTOR, I.V.R.I. & VC, SVPUAT, MEERUT WITH FARMER'S FLOCK AT TATYA VILLAGE, MALPURA



FARMERS PARTICIPATING IN CACTUS PLANTATION UNDER NICRA PROGRAMME AT CSWRI, AVIKANAGAR



INTERACTIVE MEETING AT ARC BIKANER



DIRECTOR, CSWRI RECEIVING STATE DIGNITARIES FROM BANGLADESH



ANNUAL REVIEW MEETING OF AICRP ON GI PARASITISM AT CSWRI, AVIKANAGAR



DR FISAL HASSAN IBRAHIM, MINISTER OF ANIMAL RESOURCE, REPUBLIC OF SUDAN VISITED CSWRI



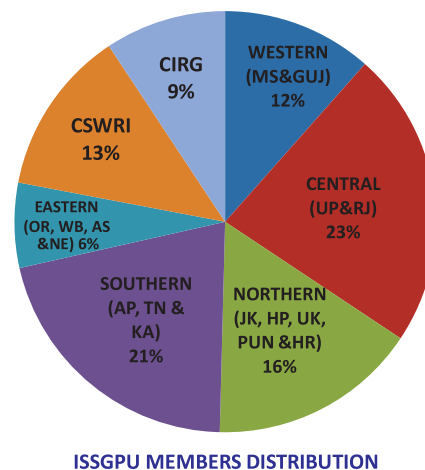
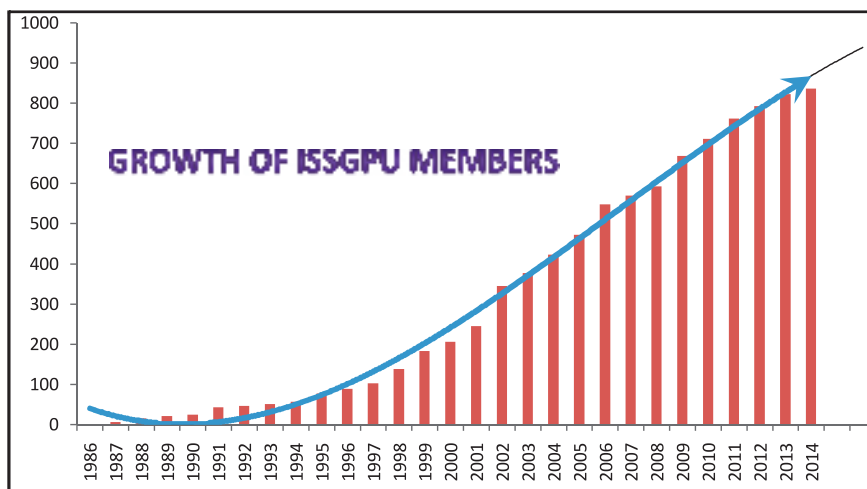
FARMERS FROM TRIBAL DISTRICTS OF RAJASTHAN UNDERGOING TRAINING AT CSWRI, AVIKANAGAR



NATIONAL SEMINAR & ANNUAL CONFERENCE AT MAHABALESWAR



CIRG WITH FARMERS OF ODISHA UNDER NICRA PROGRAMME



The contact details are updated and placed region-wise in the website. All the ISSGPU members are requested to verify and intimate for changes or modifications, if any.

BIBLIOGRAPHIC DATABASES OF CABI INDEXING

INDIAN JOURNAL OF SMALL RUMINANTS

(NAAS Rating 4.89; E-Publisher: IndianJournals.com)

(Print I.S.S.N. 0971-9857; Online I.S.S.N. 0973-9718)

CAB Abstracts, Global Health, Index Veterinarius, AgBiotech News and Information, AgBiotechNet, Animal Science Database, Environmental Impact, Forest Science Database, Nutrition and Food Sciences Database, VetMed Resource, Agricultural Economics Database, Agroforestry Abstracts, Animal Breeding Abstracts, Forest Products Abstracts, Forestry Abstracts, Grasslands and Forage Abstracts, Helminthological Abstracts, Nutrition Abstracts and Reviews Series A: Human and Experimental, Nutrition Abstracts and Reviews Series B: Livestock Feeds and Feeding, Parasitology Database, Protozoological Abstracts, Review of Medical and Veterinary Entomology, Review of Medical and Veterinary Mycology, Rural Development Abstracts, Tropag & Rural, Veterinary Bulletin, Veterinary Science Database, World Agricultural Economics and Rural Sociology Abstracts.

A. Sahoo, C.P. Swarnkar, D.B. Shakyawar, M.L. Jangid CSWRI, Avikanagar

Request to all life members

- Kindly contribute to ISSGPU Newsletter about latest discoveries, news on sheep, goat and rabbit.
- Kindly send your updates on phone number, e-mail and address to the secretary ISSGPU (dbshakya_67@yahoo.co.in).
- Please visit our website for latest informations (www.issgpu.org)

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Published By:
ISSGPU, CSWRI,
Avikanagar, Malpura (via Jaipur), Rajasthan-304501